What is claimed is:

1. An essentially pure composition of one or more members of the FRIL family of progenitor cell preservation factors.

2. The composition of claim 1, wherein the FRIL family member is from a legume.

3. The composition of claim 2, wherein the legume is *Phaseolus vulgaris*.

4. The composition of claim 2, wherein the legume is *Dolichos lab lab*.

5. The composition of claim 2, wherein the legume is *Sphenostylis stenocarpa*.

6. The composition of claim 1, wherein the FRIL family member is a mutant derived from a second member of the FRIL family, wherein the mutant is selected from the group consisting of a substitution mutant, a deletion mutant, an addition mutant, or a combination thereof.

7. The composition of claim 1, wherein the FRIL family member is a fusion protein comprising a first portion and a second portion, wherein the first portion is derived from a second member of the FRIL family.

8. A recombinant nucleic acid encoding the composition of claim 1.

9. A pharmaceutical formulation comprising the composition of claim 1 and a pharmaceutically acceptable carrier.

10. The formulation of claim 9, wherein administration of an effective amount of the formulation to a patient prior to treatment of the patient with a therapeutic treatment having a hematopoietic progenitor cell-depleting activity alleviates or reduces the hematopoietic progenitor cell-depleting activity of the therapeutic treatment in the patient.

11. The formulation of claim 10, wherein the patient is human.

12. The formulation of claim 11, wherein the patient has cancer.

13. The formulation of claim 12, wherein the therapeutic treatment is selected from the group consisting of a radiotherapeutic, a chemotherapeutic, or a combination of a radiotherapeutic and a chemotherapeutic.

14. The formulation of claim 13, wherein the chemotherapeutic is selected from the group consisting of cytarabine, doxorubicin, and 5-fluorouracil.

15. A method for alleviating or reducing the hematopoietic progenitor cell-depleting activity of a therapeutic treatment in a patient, comprising administering to the animal a therapeutically effective amount of a composition of a FRIL family member prior to administration of the therapeutic treatment to the patient.

16. The method of claim 15, wherein the patient is human.

17. The method of claim 16, wherein the patient has cancer.

18. The method of claim 17, wherein the therapeutic treatment is selected from the group consisting of a radiotherapeutic, a chemotherapeutic, or a combination of a radiotherapeutic and a chemotherapeutic.

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19.   The method of claim 18, wherein the chemotherapeutic is selected from the group consisting of cytarabine, doxorubicin, and 5-fluorouracil.

20.   A method for isolating a population of progenitor cells, comprising contacting a population of cells with a plurality of FRIL family member molecules, and separating the unbound cells, wherein the cells bound to the FRIL family member molecules are an isolated population of progenitor cells.

21.   The method of claim 20, wherein the isolated population of progenitor cells is from a human.

22.   The method of claim 20, wherein the FRIL family member molecules are detectably labeled.

23.   The method of claim 20, wherein the FRIL family member molecules are immobilized on a solid support.

24.   The method of claim 23, wherein the solid support is a bead.

25.   The method of claim 24, wherein the bead is magnetic.

26.   The method of claim 25, wherein the unbound cells are separated by applying a magnet to the population of cells contacted with the FRIL family member molecules immobilized on the magnetic bead.

27.   The method of claim 26, wherein the population of cells bound to the FRIL family member molecules immobilized on a magnetic bead are rinsed with a physiologically acceptable solution while the magnet is applied.

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28. The method of claim 23, wherein the solid support is the bottom of a tissue culture plate.

29. The method of claim 20, wherein the isolated population of progenitor cells is a population of hematopoietic progenitor cells.

30. The method of claim 29, wherein the population of cells is selected from the group consisting of whole blood, umbilical cord blood, bone marrow cells, and fetal liver cells.

31. The method of claim 20, wherein the population of cells is a sorted population of cells, wherein a cell of the sorted population does not express a cell surface molecule selected from the group consisting of CD11b, CD11c, and CD38.

32. The method of claim 31, wherein the sorted population of cells is sorted by flow cytometry or by magnetic bead selection.

33. An isolated population of progenitor cells isolated by the method of claim 20.

34. The isolated population of progenitor cells of claim 33, wherein the isolated population of progenitor cells is from a human.

35. The cell of claim 33, wherein the cells of the isolated population of progenitor cells do not express CD34.

36. The cell of claim 33, wherein the cells of the isolated population of progenitor cells express a receptor tyrosine kinase selected from the group consisting of from FLK1, FLT1, FLT3, FLT4, and Kit.

37.   The cell of claim 33, wherein the cells of the isolated population of progenitor cells express a cell surface molecule selected from the group consisting of CD11b and CD11c.

5   38.   The isolated population of progenitor cells of claim 33, wherein the cells of the isolated population of progenitor cells express FLT3.

39.   The isolated population of progenitor cells of claim 33, wherein the cells of the isolated population of progenitor cells are selected from the group consisting of

10   hemangioblasts, a messenchymal stem cells, bone progenitor cells, hepatic progenitor cells, endothelial progenitor cells, hematopoietic progenitor cells, embryonal stem cells, brain progenitor cell, and dendritic progenitor cells.

40.   The isolated population of progenitor cells of claim 33, wherein the cells

15   of the isolated population of progenitor cells are hematopoietic progenitor cells.

41.   The isolated population of progenitor cells of claim 40, wherein transplantation of isolated population of progenitor cells into an animal lacking a population of hematopoietic progenitor cells sufficient to enable survival of the animal

20   reconstitutes the animal, wherein the transplanted animal survives.

42.   A method for preserving progenitor cells *ex vivo*, comprising contacting a population of cells comprising at least one progenitor cell with an effective amount of a FRIL family member for an effective period of time, wherein the progenitor cells in the

25   population are rendered quiescent.

43.   The method of claim 42, wherein the progenitor cells are from a human.

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44.   The method of claim 42, wherein the population of cells is bone marrow cells.

45.   The method of claim 42, wherein the non-progenitor cells in the population of cells differentiate or die.

46.   The method of claim 42, wherein the population of cells is removed from a cancer patient prior to treatment of the cancer patient with a therapeutic treatment having a hematopoietic progenitor cell-depleting activity.

47.   The method of claim 46, wherein the therapeutic treatment is selected from the group consisting of a radiotherapeutic, a chemotherapeutic, or a combination of a radiotherapeutic and a chemotherapeutic.

48.   The method of claim 47, wherein the chemotherapeutic is selected from the group consisting of cytarabine, doxorubicin, and 5-fluorouracil.

49.   A method for preserving progenitor cells *in vivo*, comprising administering to a patient an effective amount of a composition of a FRIL family member for an effective period of time, wherein the progenitor cells in the patient are rendered quiescent.

50.   The method of claim 49, wherein the patient is human.

51.   The method of claim 50, wherein the patient is a cancer patient.

52.   The method of claim 50, wherein the effective amount of the composition of a FRIL family member is administered prior to the treatment of the patient with a therapeutic treatment having a hematopoietic progenitor cell-depleting activity.

53. A method for identifying a progenitor cell, comprising contacting a candidate cell with a FRIL family member molecule, wherein binding of the candidate cell to the FRIL family member molecule identifies the candidate cell as a progenitor cell.

54. The method of claim 53, wherein the candidate cell is in a population of cells.

55. The method of claim 53, wherein the candidate cell is from a human.

56. A progenitor cell identified by the method of claim 53.

57. A method for identifying a composition of a member of the FRIL family of progenitor cell preservation factors, comprising contacting a candidate compound with a glycosylated extracellular domain of an FLT3 receptor, wherein the glycosylation pattern of the extracellular domain of the FLT3 receptor is the same as the glycosylation pattern of an extracellular domain of a normally glycosylated FLT3 receptor, wherein a candidate compound that binds the glycosylated extracellular domain of the FLT3 receptor is identified as a composition of a FRIL family member.

58. The method of claim 57, wherein the candidate compound is a lectin.

59. The method of claim 58, wherein the lectin is synthetic.

60. The method of claim 58, wherein the lectin is from a legume.

61. An essentially pure composition of a FRIL family member identified by the method of claim 57.